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ROCKS and MINERALS

A Magazine for Mineralogist, Geologist and Collector . . .

INNOVATION

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. . FEBRUARY, 1938 . .

Vol. 13 No. 2 **TWENTY-FIVE CENTS** **Whole No. 79**

THE ROCKS AND MINERALS ASSOCIATION

PEEKSKILL, N. Y.

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Organized in 1928 for the increase and dissemination of mineralogic knowledge.

To stimulate public interest in geology and mineralogy and to endeavor to have courses in these subjects introduced in the curricula of the public school systems; to revive a general interest in minerals and mineral collecting; to instruct beginners as to how a collection can be made and cared for; to keep an accurate and permanent record of all mineral localities and minerals found there and to print same for distribution; to encourage the search for new minerals that have not yet been discovered; and to endeavor to secure the practical conservation of mineral localities and unusual rock formations.

Ever since its foundation in 1928, the Rocks and Minerals Association has done much to promote the interest in mineralogy. It has sponsored outings, expeditions, formations of mineralogical clubs and the printing of many articles that have been a distinct contribution to mineralogy.

Those of our readers who are members of the Association can rightly feel that they too were sponsors of these many achievements that have helped to give mineralogy a national recognition. Among your friends there must be many who would like to have a part in the Association's work—to share with you the personal satisfaction, the pleasure, and the benefits of membership. Will you give your friends this opportunity to join the Association by nominating them for membership? A nomination blank will be found elsewhere in this issue.

Each new member helps to extend the Association's activities—helps to make your magazine larger,better, and more interesting, and above all assists in the dissemination of mineralogical knowledge.

Some advantages of membership: All members in good standing receive:

(1) **Rocks and Minerals**, a monthly magazine. (2) A member's identification card that secures the privileges of many mines, quarries, clubs, societies, museums, libraries. (3) The right to participate in outings and meetings arranged by the Association. (4) The right to display a certificate of membership and to place after their names a designation indicating their membership or to advertise membership on stationary, etc. (5) The distinction and the endorsement which comes from membership in the world's largest mineralogical society.

The following clubs are affiliated with the Rocks and Minerals Association:

Canon City Geology Club, F. C. Kessler, Sec., Canon City, Colo.

National Geological Club, Mrs. D. P. Stockwell, Pres., Mt. Olympus, Kimmswick, Mo.

Reno Rocks and Minerals Study Club, Mrs. Rader L. Thompson, Sec., R.F.D. 1, Box 225A, Reno, Nev.

Rocks and Minerals Association of North Jersey, Dover, N. J.

Queens Mineral Society, Miss Bernadette Reis, Sec., 10314-97th Ave., Ozone Park, L.I., N.Y.

ROCKS and MINERALS

PUBLISHED MONTHLY

Edited and Published by PETER ZODAC

FEBRUARY 1938

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ROCKS and MINERALS PEEKSKILL, N. Y., U. S. A.

The Official Journal of the Rocks and Minerals Association

MALACHITE
Nizhni Tagilsk, Siberia

Courtesy U. S. National Museum

MALACHITE

Nature presents many surprises in the mineral world. She can take malachite for instance and have it appear in a number of forms as a stain or thin crust; granular or earthly; in beautiful crystals; in compact fibrous forms; as small tufts which when very short have the soft and shining aspect of green velvet; radiated, fibrous; concentric banded; stalactitic; and also as pseudomorphs, especially after azurite, copper, and cuprite. Also massive whence it can be mined as an ore of copper—sometimes being so compact and massive, often with botryoidal surfaces, that it can be cut and polished for ornamental purposes and even for gems. When in this form the mineral commands a higher price than it does as an ore.

Malachite is a carbonate of copper, bright green in color, whose hardness is 3.5-4 and specific gravity 3.9—4.1. Like many minerals, it also is known under a number of names as green carbonate of copper, green malachite, hemisprismatic green malachite, hydrous dicarbonate of copper, and mountain green. The mineral received its name from the Greek word for mallow, in allusion to its color.

Malachite is a common alteration product of copper minerals and is especially prevelent in the upper levels of all copper mines where it is generally associated with azurite, bornite, chalcopyrite, chalcocite, copper, cuprite and other copper minerals. Its occurrence is not limited strictly to copper mines as it may occur in any mine, quarry, excavation or rock outcrop containing copper minerals even if in small amounts. In such occurrences it is most commonly found as greenish stains or thin crusts, either coating the copper minerals, chiefly chalcopyrite, or else encrusting the rocks of the deposits.

Malachite now has four chief uses: as an ore of copper, as an ornamental stone, for jewelry, and for mineral specimens. It was formerly ground to a fine powder as a pigment for paint known as mountain green.

The greatest deposits of malachite known were at the old copper mines at Nizhni Tagilsk, on the eastern side of the Ural Mountains in western Siberia. About 100 years ago, for example, at a depth of only 280 feet, a mass was discovered in one of these mines that was estimated to weigh over 580 tons. These mines also produced the finest gem malachite, often in enormous masses, so that table tops, vases, pillars for buildings and other art objects were made of them. A mass of this gem malachite, at the School of Mines in Leningrad, weighs 3247 lbs. The Czars of Russia drew heavily from these mines for the gem malachite that was made into ornaments for presentation as gifts to other monarchs and notables.

Years ago, very fine specimens of gem malachite were also found at the copper mines at Moldawa, in the Banat, Hungary; and at the Burra Burra copper mine of South Australia (opened up in 1845).

In more recent years, fine gem quality malachite has been found at the Copper Queen copper mine, Bisbee, Arizona, and in beautiful stalactitic forms associated with azurite (in concentric bands) at the Humming Bird copper mine, Morenci, Ariz.

Today, Katanga District, Belgian Congo and Northern Rhodesia, both in South Africa, are the largest producers of gem quality malachite.

CHIPS FROM THE QUARRY

(EDITORIAL PAGE)

PETER ZODAC

Our attention has been called to the large number of items on minerals appearing in the general press. Prominent among them were many notices and extracts of articles which have been printed in ROCKS and MINERALS. **The Terlingua Quicksilver District of Brewster County, Texas; Motion Picture Photography of Mineral Specimens; Discovery of a Mastodon Skeleton near Aurora, Ill.; New Emery Strike In Peekskill;** and **The Prospector** are but some which we have noticed. In all cases of course credit has been given to ROCKS and MINERALS.

These notices and extracts must have been prepared by a news agency as they are not of local origin.

This is another indication of the tremendous interest in minerals now being manifested by the general public. The newspapers are glad to print such items as the agencies obtain them from a reliable source—ROCKS AND MINERALS MAGAZINE. If this interest continues, it will be a short time only before minerals will be featured on the radio.

We attended the annual meeting of the Mineralogical Society of America, held at Washington, D.C., Dec. 28-30, 1937. It was one of those rare occasions where one had the opportunity of meeting old friends and making new ones—all interested in mineralogy. Judging from the number of Rocks and Minerals Association members in attendance, one would have thought that the Association was holding the meeting. It was a grand affair and we enjoyed it very much.

On the way down, we ran into a snow storm but once in the city we found weather conditions ideal—just like spring in the north.

P.S. Yes, we visited the U. S. National Museum and again inspected the fine mineral specimens on display.

On Dec. 17th, 1937, we visited Mr. L. W. Little of East Hampton, Conn., one of our members in the Nutmeg State. President R. Emmet Doherty accompanied us.

Mr. Little had aroused our curiosity by mentioning in a letter that he had some golden beryls in his collection and further clinched our O.K. to visit him by offering to take us to the quarry from whence they were obtained—the Slocum Quarry.

We went, we saw, and we were amazed. For never in all our experience have we seen so many golden beryl crystals as are in the possession of Mr. Little—many of them transparent—and all of excellent quality. The quarry was visited, many crystals were obtained, and an article on the occurrence will appear in due time in ROCKS and MINERALS.

Peter Zodac

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WHOLE NO. 79

ASBESTOS

A Tale of The North

By RICHARD HAMILTON

Sprawled on the northern slope of Mile Greek Canyon lies the picturesque town of Montbestos, a collection of log cabins patchworked against the mountain and weathered by the passing years. It is the abode of silence. It is a town forgotten by the literary masters who gave us the immortal "Roaring Camp" and "Roughing It." To all appearances it has joined the ghost towns of Skidoo and Greenwater, which, in the great gold strikes of the past, sprang into being overnight and faded like a mirage. But no coroner historian has held an inquest over the remains of Montbestos, for it is not dead, it is just asleep.

* * * *

One hundred and twenty miles north of Idaho Falls and thirty-five miles from the great volcanic deposits of Yellowstone Park lies the canyon of Mile Creek and within its walls, the town of Montbestos.

It was in this canyon many years ago that a brave of the Blackfoot Indians dismounted from his horse to idly inspect a shiny rock that glistened in the sun. The rock failed to interest the old Indian, but he nevertheless carried it to the grizzled old trader many miles down the Madison River.

The old timers from the plains and prospectors from the mountains speculated and argued over the silken fiber formation, but they failed to identify the odd rock.

To settle all disputes, the old trader sent the specimen to Salt Lake City where it was pronounced asbestos, a non-metallic mineral.

In those days, asbestos had little commercial value and the Indian's discovery was soon forgotten, but with the passing years, its valuable properties were discovered and the great canyon with the mountain peak towering above became a scene of activity. The inexorable hand of man descended and the fire seared slopes were ripped and scarred by great power shovels. A tiny village of log cabins sprang up at the very foot of Montbestos Peak, whose mighty crest towered to 11,000 feet above the level of the sea. The staccato bark of jackhammers echoed up and down the great gash known as Mile Creek Canyon and dull explosions tore loose the bowels of the earth. Civilization had moved in.

Edward South, promoter, bishop and gentleman, stood on one of the claims of the Corporation talking with his mine superintendent, David Hamilton.

"Dave," he said enthusiastically, "We've got something. Its better than a gold mine. On this spot many years ago, we sunk a core drill and got evidence of pay rock to 400 feet."

He paused, gazed down the canyon and cut across the lofty continental divide, a strange light in his eyes. He softly spoke. "This is the culmination of my dreams. I have given years of my life to this project, a domestic empire of asbestos. Here will be the only major producing asbestos mine in the nation. Canada and the combine cannot compete with us for Congress will give us a tariff."

He turned to his superintendent and continued, "My work is finished. From now on it rests with you. I am but the promoter, you are the builder."

With the skeptical air of the professional, the construction engineer gazed over this mountain wilderness, unmoved by the dreams of the romanticist. Already his keen technical mind was formulating plans. A myriad of problems flashed by him in kaleidoscope. He looked down the steep canyon and saw only the 30% grade. He pictured the hundreds of tons of machinery he would bring up that cruel slope. He visualized the forbidding canyon and the great divide buried under 10 feet of snow. He shuddered and at last spoke.

"South," he said slowly, "This **is** a project."

And it was. The company possessed fourteen claims ranging from 8,000 to 10,000 feet elevation. On most of these claims, raw chrysotile asbestos of superior grade and length could be picked up from the surface of the ground. Little doubt existed as to the presence of great quantities of the valuable mineral. The uncertainty lay only in the mining and preparation for the market. Geologists and mining engineers of repute concurred in their opinions that untold possibilities existed in the great peak known as Montbestos. A small incline shaft had been started in years gone by and had exposed peridotite changing to serpentine. It was believed that both slip and cross fiber existed, there being many slickensided fault planes, while splendid cross fiber veins protruded in many places.

And so, after the years of preparation, the long and arduous struggles and dreams of the man, South, there began the immense task of building in this wilderness, a modern equipped mill and sinking the great shaft.

The project got under way late in the fall of 1930. Under the able guidance of Hamilton, the Mine Superintendent, Mile Creek Canyon became a scene of activity. A thousand tasks remained before the coming of the big snows. Cabins were erected, supplies brought in for the winter and great logs dragged down from the mountain for fuel. Hardly had these things been accomplished when there came the first of the big snows.

Winter at Montbestos. Only you who have experienced it can know of winter in the great northwest. It crushes you, buries your very consciousness in an avalanch of snow, of solitude, of loneliness. From Montbestos, an endless expanse of snow spread its panorama before you, stark and weird. There were but few who had the fortitude to brave that desolation with the thermometer at 40 below and where blizzards raged for days.

The mine superintendent, his wife and a handful of men worked throughout that bitter winter, severed from civilization, the bondsmen of industry. Once a week, a forty horsepower caterpillar crept across the great divide over snow that lay many feet deep to bring fresh provisions and mail for the intrepid little settlement.

At last, this annual cataclysm of nature, having blown itself into exhaustion, spring came to Montbestos, bringing with it flowers blooming side by side with lingering giant snowdrifts.

German engineers arrived flourishing an offer of an even million dollars for the property. They immediately departed, mute wonderment written on their faces and prompt refusal ringing in their ears.

There began to re-echo down the canyon the roar of dynamite and the bark of engines. Unbelievably, during the winter months, there had sprung up one immense building and many lesser ones. These were to house a

500 horsepower Ingersoll-Rand Diesel, ball mills, blower systems and shaker screens. Miners began to trek into the canyon from the great copper mines at Butte. Day and night could be heard the rattle of jackhammers as the yawning incline shaft penetrated the side of the mountain.

Material was hauled to the mine from the Union Pacific spur at Big Springs, Idaho, thirty miles away, over treacherous grades and dirt roads. This work was accomplished almost entirely by caterpillar tractors and each day their songs of power could be heard as they churned great holes struggling for traction on the tortuous grades.

The base of the Diesel Engine, weighing twelve tons, was the heaviest single piece of machinery to be brought up the steep slope to the mine proper. Only on one pitch of the grade did the "cat" fail with this mighty burden. To surmount this grade, a snatch block was anchored to a giant granite boulder, through which was threaded a one inch cable, enabling the tractor to effect a down hill pull.

There were many problems confronting the erectors. Scarcity of water, freezing weather and the handicap of warming lubricating oil together with the difficulties in transporting and pumping distillate to the engine, all took their toll.

The 12 inch exhaust of the Diesel was inserted into the bottom of a fifty foot dryer tower. It was believed this would supply sufficient heat to dry the asbestos fiber after it had been broken and separated from the rock.

Installation of the engine was under the supervision of a representative of Ingersoll-Rand. The erection consumed a total of three months, scarcely a record, yet thus is delineated the difficulties encountered.

And so, there finally came the day when the Deisel rested staunch and immovable on her 120 yard foundation, the big generator secure at the stern, 27 motors in the mill hummed rythmically, waiting for their respective loads, but there was to be no load for those motors for the corporation had reached its financial limit.

The first shaft had been abandoned at a depth of 150 feet and the $8,000 it cost had been casually tossed on the profit and loss ledger. A new geologist, aglow with enthusiasm, had a different idea as to where the true fault existed, and miners, working in forced shifts, sank this new shaft to 600 feet. The result was a new mountain of sparkling green serpentine, a monument to the vagaries of the mining game—but no asbestos.

Looking Down Mile Creek Canyon, Montana.

Who shall say in whose employ that geologist was, and the price of his honor in changing shafts. Can it be said that this man averted disaster to a combine doomed to oblivion by congressional tariff? What of the Germans, their painstaking examinations, their depth of study and technique? Sufficient to say that this writer through the years cannot condone the admission of failure and that beneath the rocky morass that is Montbestos, lies wealth incomparable.

Chaos resulted with the suspension of operations. The inhabitants of Montbestos had grown to love the vast canyon with its great walls towering above them. They had lived in the vision of the great strike of asbestos soon to come. They grew to feel the spirit of this wilderness and to revel in the magic of the forest.

When, then, at last came the silent exodus of these people, every heart was poignant with regret. The man South, mute and broken, gazed back over his handiwork and wept unashamed tears of regret. Over the west rim of the canyon crept a somber grey mist, a grey symbolic of the emotions of these people in that last farewell.

But this is not a tale of failure but rather of misfortune. For scattered over the rocky acres of Mile Creek is float of incomparable nature. Museums demanded it and specimen rock from Montbestos graces many a walnut cabinet.

Deep in the heart of the Big Belt Mountains of Montana stands this hulk of mountain called Montbestos, hoary with age, frowning, undefeated. If you are a promoter, in it you may find fame and fortune. If you are a geologist, the light may be shown you and your financial worries in this life shall cease. Or if you are a dreamer, you will find romance in the specters of the past that haunt the log cabins at the foot of the mighty Montbestos. You will find the great mill silent and the great engine stilled and rusting with the passing years.

The aviator who crosses the continental divide with the mail, looks down and sees the futile efforts of puny man. He sees the yawning mouths of the two great shafts, created and abandoned by the hand of man. He sees the shattered hopes and dreams of a man who visualized a domestic empire of asbestos. The face of Mother Earth leers up at him, a sardonic grin on her rugged features—her treasures still intact.

The pilot sighs, opens his throttle and passes on, a speck in the blue distance.

A Great Sale

The exhibition-sale of Arthur Montgomery on Dec. 23, 24, 26-28th, at 1 E. 44th St., New York City, was a great success. Three tables were devoted to minerals collected during the past four years by Messrs. Edwin Over and Arthur Montgomery, while a fourth table displayed new European finds. The material which attracted the greatest interest was variscite which occupied one whole table, a strikingly-beautiful show of color in polished sections and slabs of this lovely blue mineral.

About 60 people attended the mineral show.

IRON—THE BASIS OF CIVILIZATION

By WM. SULZER
Former Governor of N. Y.

Iron is the most useful and the most important mineral on earth. We can get along without gold and silver, but civilization can not get along without iron. Without iron humanity would still be in the dawn period.

How iron was discovered no one knows; but the story is told, and perhaps it is true, that thousands of years ago a camel driver made a fire, where the desert met the mountains, in ancient Chaldea. He surrounded the fire with rocks, or float, from the surrounding hills. During the night the fire melted the rocks. In the morning the camel driver saw a small piece of melted iron which the fire had smelted from the rocks. He took it to an alchemist, who found that by heating it, and then hammering it, the metal could be moulded and tempered into different shapes. This was the beginning of the Iron Age.

History tells us that the Assyrians were the first people to utilize iron for war. They used it for their spear-points and arrow-heads, and by reason of these weapons, they came down like the wolf on the fold, and captured about everything in the Near East.

The Bible tells us in Genesis, Chapter 4, Verse 22, that Tubal-cain was an instructor of workers in iron. Long afterwards Solon, the Greek law giver, and philosopher, visited Croesus. The latter was then the richest man in the world on account of the gold he possessed. He took great pride in showing it to Solon, and asked the great Greek his opinion. "You have much gold," said Solon, "but if a man should come with iron he will take it away from you." Solon's prophecy came true. Cyrus came with iron, conquered Croesus, and took away all his hoards of gold.

The discoverer of iron was one of the greatest benefactors in the world. He deserves the commendation of humanity, and a monument to his memory should be erected in every civilized country.

If there were no iron there would be no steel; no ferro alloys; no steam; no factories; and no manufacturers. The farmer would still be plowing with a crooked stick; wars would be fought with clubs; there would be no railroads; no ships on the Seven Seas; and civilization would be where it was in the Stone Age.

Old Mother Nature created iron. She put some of it in everything that lives. Besides she realized how important this metal would be to human beings, and for that reason she distributed it, with a generous hand, throughout the earth.

The symbol of iron is Fe. Its atomic weight is 55-85. On account of its abundance it has been mined, worked, and utilized from a most distant period. From its discovery to the present time, geologically speaking, the world has been in the "Iron Age," notwithstanding what a few say about the Bronze Age and the Electric Age. The truth is that there have only been two Ages in the history of mankind, viz: the Stone Age and the Iron Age; and we are still in the "Iron Age." If there were no iron there would be no hydro-electric plants, and no utilization of electricity. Civilization would be in the ox-team stage of development and transportation.

Since the discovery of iron great progress has been made, during the intervening centuries, so that today, from a chemical and metallurgical viewpoint, the basis of all progress, of all manufacturing, of all advancement, in war and in peace, here and everywhere, is due to the production, the manufacture, and the utilization of iron. It is the basis of every industry, and the vanguard of every step along the great highway of humanity. So long as the supply is available civilization will march on to higher, and better, and greater things for the benefit of all concerned.

All honor to the discoverer of iron! All hail iron—the most essential metal in the universe!

SOME HIGH LIGHTS OF AN EXTENDED MINERAL COLLECTING TRIP

By ANDREW BENDER

Being a teacher of Chemistry and Mineralogy, I have for a number of years taken trips during the summer to gather specimens. This summer's trip was an especially interesting one and included a number of incidents that may be of general interest.

Mrs. Bender and I left Annville, Pennsylvania, August 4th, with the Selenite crystal deposits of Ohio as our first objective. After inquiry at Ellsworth, Ohio, I learned that "Crystal Bank", along an unnamed stream about a mile east of the town, was where they could be obtained. I soon found that a shovel would be more useful than a mineralogist's pick and so I borrowed one. The crystals are embedded in a very tough clay and where they are protected from weathering are generally perfect. After about five hours of digging in a blazing sun, I went away with over two hundred crystals about one-fourth of which were perfect specimens.

Crossing into Indiana we stopped at the Bedford limestone quarries. The Indiana Limestone Company was very courteous in showing us through the quarries and stone-working plants at Oolitic, five miles north of Bedford. Here has been finished the stone for many famous buildings including the Temple of Learning at the University of Pittsburgh.

We next visited the Fluorite deposits of southern Illinois. Mr. Blee, the superintendent of the Benzon Fluorspar Company, was especially courteous to us. He also took us to his home to show us his collection of minerals which is a very good one. We obtained many specimens of golden yellow, purple and colorless crystallized Fluorite several of which were of museum size and very attractive.

We also visited the Rosiclaire Fluorspar Company. Their workings do not yield such fine crystallized specimens as those of the Benzon Fluorspar Company but I was allowed to select any material from their stock and I secured several good massive specimens and also some Galena which occurs in limited amount with the Fluorite. The Fluorite has very much the appearance of Cryolite.

Our plans included a visit to several deposits in Arkansas but very hot weather persuaded us to stay above the Arkansas-Missouri line. Several years ago I visited the Joplin lead-zinc district and obtained over fifty specimens. This district is a crystallographer's Paradise. Specimens are easily obtainable in any size and at prices from five cents to twenty-five dollars each from numerous roadside stands. I also had the privilege of going down into one o the mines of the Tri-State Lead Company.

On visiting the district again I promised myself that I would get only especially fine or unusual specimens. I have a distinct weakness for acquiring specimens using the argument that no two specimens are ever alike. Calcite, Galena, Sphalerite, Dolomite, Marcasite and Barite in unusually fine crystalline form are available here in quantity perhaps not equaled in any other part of the world. In spite of resolutions I came away with a large number of superb specimens. Mrs. Bender's questions of where I will put them all has not been entirely answered yet.

Crossing Kansas we reached the Rockies to spend a few days in the Pike's Peak region. The visit to the Cripple Creek gold field resulted in getting the finest specimens of gold tellurides—Calaverite, Petzite, etc.—that I have ever seen. From assayers and through repeated inquiries I learned where to purchase a number of very rich specimens. The superintendent of the Ajax Mining Company at Victor, a few miles south of Cripple Creek, presented me with several fine specimens. From him I learned much about the extraction of gold from these

telluride ores. These metallurgical operations are carried on at Colorado Springs.

Samples of the various granites found in the Pike's Peak region were obtained as well as of the red Lyons sandstone so prominent in the Garden of the Gods. Since returning home, to satisfy my curiosity I determined by analysis the percentage of iron oxide cementing the sand in this sedimentary rock and found it to be only .84 per cent, the remaining 99 per cent being nearly pure quartz sand. This bright red sandstone constitutes the rocks of unusual form such as the "Balanced Rock", "Steamboat" and "Hoodoos" which make this region a Wonderland. Other specimens obtained were of Niobrara Limestone and Gypsum, both very evident at the "Gateway to the Garden of the Gods".

Of the greatest aid in making a trip of this kind are the Geological Folios published by the U. S. Geological Survey. Only a small part of the United States has been covered and unfortunately these folios are nearly all out of print. I had with me the Joplin, Colorado Springs, Black Hills and other folios and they were of inestimable value in studying these regions.

From Colorado Springs we went north visiting next the works of the Rocky Mountain Alabaster Company at Fort Collins and getting fine specimens of Alabaster rock and art work. Our next objective was the Black Hills. From my School Geography in country school I called Lead, the famous Black Hills mining town, Lĕd and supposed some of the heavy metal was found there. When I heard natives call it Lēd I inquired why is was so named. I was told that it was early predicted that it would soon be the leading town in that region. Indeed the Homestake Gold Mine, which is the largest gold mine in America and which is located there, has made the prediction come true. I wonder if others have pronounced the name of the town as I did.

A charge is made to be taken through the plant but the trip is most instructive. Giant operations of cyaniding and amalgamating recover sixty thousand dollars worth of gold daily from an ore averaging ten dollars worth of gold per ton. From moving belts carrying the ore to the stamp mills, we were allowed to take samples. One might look in vain for nuggets. They are seldom found. In the superintendent's office a small vial contains a few bits of gold that have been found.

Visiting the famous Etta and Hugo mines near Keystone, S.D., I obtained select specimens of Spodumene, Amblygonite, Feldspar and Mica. Specimens of granite from the famous Rushmore Mountain where Gutzon Borglum is producing a national monument of gigantic proportions, latticed iron ore from Iron Mountain, Rose Quartz, Lepidolite, and some small Geodes comprised the minerals obtained in this region.

Coming east we stopped at the giant ore wharfs at Lorain, Ohio and got some select iron ore from the Superior deposits. The micaceous Hematite from this deposit is most unusual and very attractive.

The last quarry visited was that of the Kelly Island Lime Company at Clay Center, Ohio. Here a number of Celestite specimens were obtained together with a number of fossils from this strange formation. A plant foreman presented me with an especially fine Celestite specimen. Continuing eastward we stopped at State College, Pennsylvania to visit the Minerals Building and see the collections of minerals there. From State College a few hours drive brought us home—having been gone exactly three weeks.

SIMPLIFIED METHODS FOR THE EXAMINATION OF MINERALS

By PAUL WALTHER

Most works about Minerals and of those chiefly Dana's contain such an enormous lot of scientific matter that the average mineral collector, who wants to test some new specimens, soon gets disheartened. For some years mineralogists and chemists in Germany, have been working out some simpler ways for analyzing minerals to determine methods for the average collector so that he may be able to find out for himself which is which mineral.

One of the best books is that by the late Prof. A. Weisbach of the Freiberger Bergacademie (college for mining). He divides the minerals into three main groups.

I. Those with a metallic sheen.

II. With semi-metallic and ordinary sheen but colored when powdered.

III. Ordinary sheen but colorless powder resp. streak.

Those three main groups are subdivided again into other groups.

'I. Into red, yellow, white, gray and black minerals.

'II. Contains those minerals which show a black, brown, red yellow, green or blue streak resp. powder and those, which give a colorless streak.

The 'III. group is subdivided into minerals according to their hardness:

a. very soft, b. soft, c. half hard, d. hard, e. very hard. As examples of the last group which may be for very soft (a):

Soapstone, Gypsum, Muscovite.

For soft (b):

Calcite, Heulandite, Sphalerite.

For half hard (c):

Chabasite, Magnesite, Opal, Datolite, Apophyllite.

For hard (d):

Analcite, Thomsonite, Willemite, Rhodonite, Augite, Orthoclase.

For very hard (e):

Prehnite, Cassiterite, Quartz, Tourmaline, Beryl, etc.

Of course the most important part of mineralogy besides the study of the crystals is the chemical composition. Besides, a specimen without the knowledge of its constituents has, if it is not remarkable for its beautiful form, really no value at all and might for all the good it does to the collector easily be replaced by some pieces of brick or paving stone. What collector would try his very best to get specimens of Orthite, Perowskite, Pyrochlore, Xenotime, Fergusonite, Monazite and of so many other minerals, which are far from being show pieces if it were not for the fact that these minerals contain the rare metals as Cerium, Didymium, Lanthanium, Yttrium, Titanium, Niobium, Thorium, Erbium, Uranium, etc. But still a large number of collectors have no idea what the specimens in their collections consist of. Of course it would be impossible for any except a trained chemist to analyze the above mentioned rare minerals, but I think the constituents even of those rare minerals ought to be given either on the labels on which the specimens rest or in the catalog. I, myself, am more in favor to show the constituents direct with the specimen—then one has them always before one's eyes instead of having to look for them in the catalog. Now I have mentioned only the rare metals but what about the more common ones as Iron, Cobalt, Nickel, Manganese, Copper, Lead, Bismuth, Gold, Silver, etc.? and the acids or groups of elements those metals are combined with? A great number of collectors have sometimes a vague idea that such or such a mineral is an iron, a copper or silver ore, etc. but if it is a sulfide a sulfate, an oxide, carbonate or silicate, etc., they do not know. In many cases it would be very simple to find out not only what

metal is present (at least in case of heavy metals) and which is the acid those metals are combined with. The whole apparatus necessary to find most metals and many of the acids they are combined with in minerals are a few pieces of wood (matchsticks will do), a crystal of washing soda, a small mortar (which in case of need might be replaced by any small shallow cup and a glass stopper), a small magnet or a magnetized knife blade, a few pieces of filter paper, and a Bunsen burner. Lastly perhaps a half ounce bottle each of nitric acid, hydrochloric acid and liquid ammonia. With those things you can find Iron, Lead, Copper, Silver, Gold, Tin, Bismuth, Antimony, etc., and prove at the same time the presence of sulfur either in the form of sulfides or as sulfates. The way to work this neatest of all mineralogical tests is as follows. One heats gently a crystal of washing soda in the gas flame till it melts; only very little heat is necessary. With the molten soda one covers ¾ of an ordinary big matchstick well so that the wood is fully impregnated. Then one holds that stick in the gas flame (about ¼ inch) till that part is charred. Now one takes a very little of the powdered mineral or a minute splinter (a 1/10 of a grain is quite ample) in the hand and mixes it there with a fresh drop of the molten soda to an even paste, which one takes up on the charred end of the impregnated matchstick. If you put now that end of your matchstick into the flame beginning from the top downwards to the hottest part of the flame and hold it there till the mass has melted together to a homogenious mass and does not boil any longer, you have reduced the metal in the ore to metallic splinters or globules and in case of sulfur present in the ore, that is now combined with the soda slag and so are all the other acids. The next thing to do now is to separate the metal from the slag and coal. One pinches the cold top of the match off with the fingernails, puts it into a small mortar, and grinds it with 3 or 4 drops of water. A drop of that water one takes up on the tip of a finger and puts it on a clean bright silver coin. A brown or black spot which appears after a few minutes on the coin indicates the presence of sulfur through the action of the sodium sulfide on silver. The ore was therefore a sulfide or a sulfate. About that later. The mixture in the mortar is now ground with more water, the black liquor is gently poured off and fresh water added into the mortar. If the first black water has been poured off not too quickly but gently you will find on the bottom after 2 or 3 washings, minute flakes, which after drying in the mortar are either attracted by the magnet showing them to be Iron, in rare cases, Nickel too, or the flakes may show the yellow color of Gold, the white of Silver which is ductile, the slightly harder white Tin, as globules, the brittle bluish white Zinc splinters, the soft bluish white Lead globule, the brittle grey Antimony, or the reddish Copper. Above I mentioned Sulfides and Sulfates. Sulfides are mostly colored and have a more or less pronounced metallic sheen, sulfates never show a metallic sheen and are very often soluble in water. Then there is the difference between Iron, Nickel and Cobalt which all 3 are attracted by a strong magnet; a weak magnet attracts iron only. A further proof for iron is made as follows: One takes a minute speck of the dust from the magnetic knife point on filter paper and covers it with a drop of hydrochloric acid. Then alongside the acid covered dust a drop of red prussiate of potassium solution is placed. As soon as the 2 drops meet you get a blue mark of prussian blue. Gold cannot be mistaken very easily for anything else, but if you want to make sure it is gold put on it a drop of nitric acid; gold is insoluble in that acid which would dissolve most other metals. The presence of silver with the gold would be shown by the heavy cheeselike precipitate of Silver chloride if one adds a little common salt to the nitric acid with which one has treated the speck of gold. On the other hand copper with the gold will be

detected by an intensive blue mark when a drop of Ammonia is added to the solution. The white silver is soluble in nitric acid, but the minutest particle of common salt, would produce the cheese-like white precipitate in a drop of silver solution. The difference between Tin and Zinc consists in the higher hardness viz. brittleness of the Zinc. Lead as mentioned gives a few soft ductile globules where as the other metals are divided into more and smaller globules.

There are many more metals which can be tested by the above method but the verification of them would presuppose a certain amount of chemical knowledge. I forgot to mention arsenic which when heated gives off an unpleasant odor of rotten radishes. Then nearly all metals can be detected by catching the fumes given off by the minute particles (when heated to melting) on the underside of a small china basin. The precipitated fumes differ sometimes greatly in color, others are treated with different reagents and so are analyzed. Now after we have seen how easy it is to produce the metals after Professor Bunsen's method from the ores let us start again with the method of Professor A. Wiesbach.

His first group is minerals with metallic sheen and the first part consists of minerals of a red color. The first mineral is Copper, formula Cu, color—copper red often with brown coating, streak—copper red (bright), hardness—3, tenacity—ductile, form of crystals cubes, octahedrous, dodecahedeous, crystals often distorted. Cleavage—none. Form of the aggregate—massive, thin coating on other minerals, mosslike, leaflife, treelike. Remarks: in thin plates can be easily bent. Associate minerals Cuprite, Malachite, Azurite, Prehnite, Datolite, Calcite, Analcite, native Silver, Limonite, found in porphyry, limestone, clay serpentine.

Let us take another one at random. Smaltite. Formula $CoAs_2$. Color—tin white, when cryptocrystalline grey, often with thin dark grey coating. Streak grey. Hardness 5. Tenacity tough. Form of crystallization-Isometric, crystals often curved and cracked. Form of the aggregate massive, short fibrous, or finely granulated. Remarks—often coated peachy-red, gives red solution with nitric acid and smell of garlic when hit with hammer or heated. Associated minerals cobalt nickel lodes with Bismuth, Silver, Proustite, Barite, Fluorite and Quartz.

The whole outfit necessary for the examination of minerals according to Professor Weissmann's book consists of a pocket-knife, file, a piece of unglazed china, magnifying glass, compass, set of minerals to estimate roughly the hardness of the specimens and perhaps a contact goniometer, but one can do very well without that instrument simple and cheap as it is.

The number of minerals necessary to examine the hardness of other minerals is ten, beginning with Talc 1, then Rocksalt 2, Calcite 3, Fluorite 4, Apatite 5, Orthoclase 6, Quartz 7, Topaz 8, Corundum 9, and Diamond 10. For general use one can do without the last two minerals. Care should be taken to use only crystals or clean cleavages so that one can easily detect any scratches. A mineral which scratches orthoclase but not a quartz crystal has consequently the hardness 6. After some time one is able to estimate pretty fairly the hardness of a specimen with only the help of a good pocket knife and a piece of glass at least up to hardness 7, included. Besides the harder ones are with a few exceptions of the sometimes so-called solerolite (hard stones) group which includes the semi-precious and precious minerals as Topaz, Beryl, and Spinel, Corundum, etc., all of which in crystallized specimens are easily detected by their specific forms of crystallization.

BLACK LIGHT

By HENRY MOELLER

Research Director, Vio Flour Products Company

Nature

So weird, unpredictable and spectacular have been the photo conversions produced by ultra violet radiation that the phenomenon seems to the layman to be identified with the legerdemain of Black Magic which perhaps accounts for the nicknaming of Fluorescence as "Black Light."

The electro magnetic waves of ultra violet energy are, like electricity, little understood as to nature and cause but decidedly useful in resultant effects.

Early experiments in fluorescence depended upon the employment of black glass acting as a filter to block out visible rays which may further account for the nickname "Black Light."

Photo luminescence which requires the activation of invisible ultra violet rays is subdivided into fluorescence and phosphorescence. Objects which absorb, reradiate and retain energy for varying periods of time after activation are said to be phosphorescent. Those which only retransmit while the exciting or agitating energy is in contact are classed as fluorescent.

Iridescence, especially of crystals, visible to the naked eye without extraneous energy, is not to be confused with ultra violet luminescence. Many precious stones and certain varieties of glass being iridescent are known as auto luminent.

Source

Wave lengths now better understood by all due to radio dialing or bands play an important part in the fluorescent effects produced. Rays from various parts of the invisible spectrum (ultra violet, x ray, gamma or cosmic) or even visible light striking objects reappear in other wave lengths of the spectrum and always of higher length than the original source. Ultra violet in the spectrum is below 4000 Angstrom units while visible light is between 4000 and 7600 Angstrom units. The seven subdivisions of the rainbow colors have no clearly defined limits but blend into each other exactly as seen in the rainbow. The four major divisions of the visible spectral range are: violet and blue from 4000 to 4950 Angstrom units, green from 4950 to 5650, yellow from 5650 to 5950, orange and red from 5950 to 7200. Stated in approximate percents: violet and blue 30%, green 22%, yellow 9%, orange and red 39%. The intensity curve when plotted shows increases in the violet, blue and green.

True Fluorescence

What is "true fluorescence?" As all results are somewhat abortive, to refer to any charted color of fluorescence or phosphorescence as the true fluorescence is in itself untrue. Any listing of fluorescent or phosphorescent characteristics must include the energy source employed (iron arc, carbon arc, mercury arc, argon, tungsten) together with the nature of the glass envelope or intervening color filters.

Uses

The practical uses of ultra violet in producing fluorescence are many.

Mineral testing is commercially important as well as fascinating to the amateur collector. Kunzite was discovered by the aid of ultra violet. The New Jersey Zinc Co. employs ultra violet for testing Willemite concentrates and tailings.

Stamping inks which are impervious to soaking, boiling, abrasion or lime are used for laundry marking. While invisible to the wearer, sorting is readily accomplished in the laundry by the use of ultra violet. Disfigurement of garments by indelible markings or stamping on of tags is eliminated.

Commercial printing ink is a new field. This article is printed in an ink which has been specially treated to fluoresce. ROCKS and MINERALS is among the first to have fluorescent pages included in a regular issue. Probably among no other group of publication readers could be found those possessing ultra violet units in homes and offices where this innovation could be viewed. According to the ultra violet sources used to produce the color change, these pages printed in a commercial vermillion ink will fluoresce between shades of brilliant yellow, green or gold. The publishers of ROCKS and MINERALS as well as the writer are desirous of receiving comments from the readers after this phenomenon has been viewed with the various ultra violet units at their disposal. One of the most difficult inks to cause to change under fluorescence is black. The writer's company has accomplished this and it is expected to furnish this ink for a succeeding issue of ROCKS and MINERALS. Purple or violet are also difficult but it is expected to make this available as well.

From this development of ink may result advertising employing make and break electric circuits to show a natural color with white light and a marked contrasting color with ultra violet.

In the detection of crime, ultra violet energy is definitely relied upon in cases involving fraud, larceny and murder. A unit known as Detectoscope marketed by Vio Finor Products Co. is employed in penitentiaries throughout the country to detect the presence of dope treated wrappers, twine or letters being sent to inmates. All letters, outgoing and incoming, are examined under this lamp to discover any secret writing or invisible marking. Prison breaks have been arranged by employment of acids or alkali to write secret messages. While de-

fecting such foreign matter is laborious by other methods, it is instantaneous with ultra violet.

Stage effects using paints or fluorescent dyes are a common use.

Harmful Results

Ultra violet energy should be used cautiously. For the production of fluorescent and phosphorescent effects, long wave ultra violet energy is readily transmitted by ordinary glass. Energy rated below 2800 Angstrom units should only be used with protection for the eyes in the form of dark goggles. The cornea is unaffected by energy above 2800 Angstrom units but serious impairment to vision, cancer and tuberculosis may result from continued exposure to short wave ultra rays. Iron arc, carbon arc and mercury arcs should be used only with shielding goggles when it is known that the energy rates below 3200 Angstrom units. Soda lime glass is a definite cutoff for ultra violet radiation below 2800 Angstrom units. The safety factor is simple when it is understood that no ultra violet rays from the sun reach the earth or the eyes of mortals below 2900 Angstrom units which is the atmosphere cut-off. The short wave ultra violet rays are abiotic or degenerative. Aging of skin tissue accompanies exposure to short wave ultra violet. Its effect is one of sterilization and bacteria or germs may be killed with dispatch with the energy.

Bio-Physical Effects

Ultra violet when controlled and in conjunction with visible light and short wave infra red produces a marked physiological effect. Its curative benefits are well attested after thirty-five years of helio or sun therapy as practiced largely in Europe. The sun lamp of General Electric Co. employing a combination of tungsten filament emitting a continuous spectrum from 2900 Angstrom units to 40,000 (similar to sunshine) and a mercury arc for ultra violet and visible light emphasis is a medically approved unit. The approximate percent of energy input in the G.E. S-1 lamp is: Ultra violet 2.2, Visible light 10.5, Penetrating infra red 46.8, Surface infra red 40.5.

Ultraf Products, Inc., Boston, is marketing a unit for dentists and doctors employing the same spectrum as G. E. S-1 without the mercury arc and with a filter cut-off of surface infra red.

The field of fluorescence analysis is still in its infancy. Mineral collectors may well contribute much of value to the general fund in their examination of various specimens. Study groups in local mineral clubs could with individual profit meet to exchange findings and discoveries.

Acknowledgment for data used in this article is made to the following: Lawrence C. Porter and J. P. Ditchman of General Electric Co., Nela Park; Conco News Chats, Central Scientific Co., Chicago, E. V. Boerschler, Ultraf Products, Inc., Boston, "Color as Light," International Printing Ink Corp., N. Y.

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A YOUNG MINERALOGIST

By MISS EVELYN WAITE

"Mica", was the shy but definite response of the tiny,curly-haired blonde to her fond aunt's inquiry about a quantity of new insulating material on display in our local hardware store, much to the amazement and amusement of employees and customers.

And MICA it was! The young lady who was so sure of her identification was Betsy Anne Waite, aged 28 months, of Crestwood, N. Y. Betsy had, only the previous week, accompanied her parents, Mr. and Mrs. R. T. Waite, and her aunt, the writer, on a search for minerals at the old Baylis quarry at Bedford, N. Y., where she collected many bits of mica, feldspar and rose quartz, which she carried herself in a little knapsack slung across her shoulders.

Betsy has been taken along on her family's and friends' collecting trips since the fall of 1936 when she was only a year and a half old, and learned to climb rock piles as other children do sand piles. Indeed, her happiest hours have been, during the past year, those spent digging and playing, not in a sand box or dirt, but in the rough gravel driveway, and many times neighbors and passers-by have remarked on her sitting and playing so long on and with stones.

When she received on her second birthday a sand-table with real sand in it, it was soon emptied and refilled with stones. Many times Betsy and her little neighbor playmate pick out and collect pretty pieces of quartz and mica, calling them by name when shown to others.

Before she could talk, Betsy could pick out, in her aunt's collection, rose quartz, conglomerate, serpentine, green talc, smoky quartz, and a number of other specimens, when named to her by her mother. And now she can name quite a few of them herself, no matter where found.

Last summer, while walking along the breakwater near the entrance to Port Jefferson Harbor, L. I., N. Y., returning from a pebble gathering expedition to East Setauket Beach, the writer found a number of large boulders of gneiss and biotite schist heavily dotted with GARNETS which she pointed out to the rest of the family, Betsy looking on as usual. Later, when we called to the young miss, who had lagged behind again to pick up pretty stones, we were greeted by, "I dot GARNETS, too." And so she had, prettier ones than we had found, in a small rock broken off and lying in the sand.

Betsy Anne Waite

The accompanying snapshot was taken at the old Kinkel quarry in Bedford, N.Y. on Sunday, Oct. 24th, 1937, a cold blustery day, when we had stood around a campfire eating our dinner with sleet and hail falling in the dishes as we ate during an unexpected shower. Betsy was perfectly happy, in spite of all discomforts, in a woolly snow-suit, rain cape and rubbers, running around picking up sticks for the fire and later MICA for her collection.

Surely with such bringing up and associations she should become a real rock-hound and perhaps a more experienced mineralogist than any one in the family now is, having been initiated so young into the ranks of collectors and admirers of pretty stones.

BRIEF NOTES ON MINERAL COLLECTING IN RUSSIA

By RICHMOND E. MYERS

In most parts of the world, collecting minerals is a pastime that uses the same technique. You simply start out by train, auto, or on foot—arrive at your mineral locality, secure whatever permission may be necessary, and go to work. When you have filled your bags and pockets (assuming the Gods have smiled upon your efforts) you go home with that satisfied feeling that makes mineral collecting worth while.

This however is not the case in that portion of the world commonly referred to as the U.S.S.R. There are many reasons why it cannot be so. Probably the most important is the fact that not everybody is allowed to collect minerals. Only he or she who is actually engaged in some kind of geological work and represents an institution or organization with a collection may visit localities openly for the purpose of securing specimens. Minerals belong to the government—all of them, found or waiting to be found—and therefore the collector who takes specimens steals from the country. As a consequence, private colections, as we know them in America, do not exist in Russia.

Institutional collecting is of course sanctioned under supervision. Students and professors may visit localities together—and do so, but all finds belong to the school or university. Of course students may keep "working collections" but even these do not rate as personal property.

The above paragraphs refer of course to citizens of the U.S.S.R. Foreigners who might visit the country with the idea of collecting would find themselves up against insurmountable obstacles. Permission to visit and collect would not be refused, but the proper person to grant that permission is never to be found. Usually he "is away on his holiday" or simply "cannot be reached for a few weeks." Should this permission, by some magic, be secured, your collecting would be limited to a very short time and your finds subject to a close examination before you left—for anything worth while would be retained by the authorities.

At the present time, official collecting, or as the Russians call it, "Geological Prospecting", is greatly encouraged but not in known localities. New mineral deposits are greatly sought and honors await the finder of any new mining region. Geologists are considered among the most important scientific groups of the nation and are honored as such but their contributions are all made for the "glory of the people" and under this impetus alone do they search the Arctic and the wilds of Siberia for deposits of gold, nickel, or petroleum.

There are many mineralized regions in Russia. Some of them have been world-famous for years. The pegmatites of the Urals have yielded valuable gems for generations and from the same mountains has come one of the world's major platinum supplies. The Donetz Basin with its coal and iron, the Caspian depression with its petroleum, all have been featured in geography books for years Yet the development of these resources prior to the Revolution was only partial. Russia of today is looking for, and has found, many new regions of mineral production. The old regions have been "rejuvenated" and new strikes have been made in old districts. Backed by the desire of the Soviet authorities to develop a self-sustaining nation—independent from world trade—intensive searching of every possible region where minerals might be found has resulted in the discovery of the Central Siberian gold deposits which are supposed to place the U S.S.R. among the first gold producing nations—if not at the head of the list. Discoveries in the Kola peninsula and Nova Zembla are opening up important mining activities in these regions about which Czarist Russia never dreamed. Almost daily the press announces new finds and discoveries by

geologists. One wonders if the pre-revolutionary geologists were as bad as the new regime paints them or if the production estimates of the Soviet academicians are inclined toward inflation. Of course, the development of the resources of old Russia was not in the hands of the government—it was managed by private capital which was limited. Today, with the power and forces of the nation behind them, Soviet geologists have the opportunities to lay bare the whole country.

Aside from officialdom, distance is a hindrance to the Russian collector. A nation that covers about 1/7 of the earth's surface takes in a great deal of latitude and longitude. Mineralized regions are widely separated and when reached, well isolated. We who are used to dashing to Paterson, or Bedford, or whatever our favorite haunts might be for a day's collecting, will find it hard to appreciate what the resident of Moscow or Leningrad is up against if he wants to dash off for a day on the rock pile. A week by train would be his collecting jaunt (assuming it possible for a Russian simply to buy a railroad ticket and make the trip).

So you folks who live in countries where collecting is possible—give thanks to the powers that be—that the freedom of the mine dump is yours.

Editor's Note: Mr. Myers represented the Rocks and Minerals Association at the Seventeenth International Geological Congress held at Moscow, Russia, July 20th to 29th, 1937. We hope to print, in due time, another and a arger article covering his mineralogical trips in that country.

Detach here or nominate by letter if you do not wish to mar this page.

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A PORTABLE ARGON LAMP

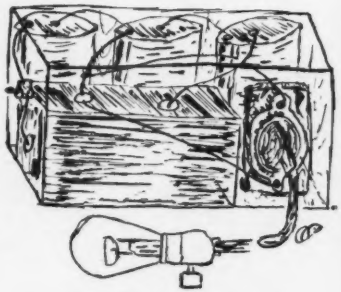
By W. D. QUINN

Ever since the argon bulb was first introduced to the "average collector", way back in 1933, this selfsame "average collector" has bewailed the fact that the argon bulb, the ideal source of fluorescence, was not convertible to field work. Because of the necessarily high cost of the other lamps—such as the cold quartz —which were adaptable to dry cell operation, a suitable apparatus for the economic mineralogist was lacking. To my knowledge (which is not very great), though much work has been done in this line, success as to the discovery of a portable argon bulb has been more or less imminent.

My interest in fluorescence has gone hand in hand with that of minerals ever since I started collecting Naturally, therefore, when I see an article pertaining to this subject in a newspaper or popular magazine, I immediately sit up and take notice. In this way there recently came to my attention an item concerning the use of the Ford spark coil as to U.V. and X-rays. The method prescribed was to connect from 2 to 4 dry cells in series, with the spark coil, and then to bring a 60 watt bulb into contact with the metal. The fluorescence produced by this arrangement was, for obvious reasons, not very spectacular. This was mainly due to the fact that the frosting on the bulb would not emit enough light of any kind to sufficiently illuminate the specimen.

Though the results obtained by this method were not very interesting, it occurred to me that if an ordinary bulb would project U.V. emanations, why not the argon bulb? For all I know, someone may have, or even have discovered a much better solution to this problem. However, as the writer has not heard of such a person, and doubts if you have, he passes an idea along.

I was not wrong in my assumption. Quite accidentally I found out that if the negative terminal of the second or third battery was connected so that it came within an eighth of an inch from the terminal of the spark coil, so that



The Portable Argon Lamp

an arc was produced, and a wire run from this to one of the prongs of a base plug to which the argon bulb was connected, and then another from the spark coil terminal, but not touching the first wire, to the other prong of the base plug,* that amazing results are obtained. Now turn on the spark coil. An arc is seen. Turn on your argon bulb. The arc ceases; the argon bulb lights almost as brilliantly as with house current. In the crude diagram that accompanies this article, you may see a suggested portable outfit.

Many interesting phenomena were observed (with the first mentioned system). Among them was the fact that, if you held your hand on the bulb on place it contacted a shaft of light came to meet it. Another was that, if you held a lighted bulb in one hand and an unlighted one in the other, the other would also light.

You can have much fun with your Ford spark coil whether you use an argon bulb or not. Little arcs of carbon, iron, zinc, etc. can be made, all of which show fluorescence in a small way; and then there are the X-days. If any of you ROCKS and MINERALS readers have been conducting similar experiments, I would be interested in corresponding with you.

* This is connected in much the same way that it was originally with the spark plugs.

A NINE DAY MINERAL HUNT

By WILFRED C. EYLES
San Francisco, Calif.

The good Lord has seen fit to hide His minerals in outlandish places where the extreme heat of the summer months gave our party good cause to sally forth in a much more comfortable period. Mr. Harold Soper, a San Francisco amateur collector of note, and your author left San Francisco on Saturday morning, May 1st, at 4 A.M. going over the new Bay Bridge to Berkeley where Mr. John Melhase, a noted geologist and mineralogist of Berkeley, was waiting with his sleeping bag and other camping equipment which was packed aboard our trailer.

We crossed the Sacramento River at Crockett by way of the Carquinez Bridge, thence north through Vacaville, Davis, Willows, Red Bluff, Redding, and onto Baird. At the junction of the McLoud and Pit Rivers, about 270 miles from home, we found our first mineral, hedenbergite, as float among the gray rocks. We made camp here and drank plentifully of the crystal clear water draining down from the Mt. Shasta area. . . Next morning at daylight we were up and after a hearty breakfast, we were away, still toward the north up through Dunsmuir with mighty Mt. Shasta over 14,000 feet on our right, then through the lumber town of Weed. Before reaching Yreka we turned off to the west and onto Fort Jones, a very picturesque little village.

After considerable search we found the ranch of Mr. T. V. Elliott. Here, we had been informed, was the beautiful gem quality rhodonite, but this information proved to be wrong as the material was iron stained quartz.

We wasted no further time, and going off on a very poor and seldom used road we joined the road following the Klamath River down to Happy Camp. Darkness came on and we camped in a thickly wooded rugged and mountainous country, having covered about 190 miles that day. Next morning, bright and early, we started our third day arriving at Happy Camp, a very quaint and out-of-the-way place. Happy Camp is active and prosperous—the main industry being placer mining, and has all the earmarks of a fisherman's paradise; for here, only reached by steep and winding mountain roads, Indian Creek joins the Klamath River. We knew the minerals came from that vicinity, but we did not have the exact localities of them.

After driving up Indian Creek about 10 miles and asking various residents about our minerals without any success, we noticed a placer miner basking in the morning sunshine on his shanty steps. He proved to be a real find, as well as a time-saver. After describing rhodonite to him, he pointed to a mountain range in the background and said that it could be found there. Little did we realize how these people belittle distance, mountain climbing, and other hazards. He said there might be some snow and we could not go all the way by car. Seeing that he knew of which he spoke, we hired him as our guide and well we did. He was only too glad to accept our offer and led us up a mountainous grade only used by the Forestry Department, to a forest lookout. Up and up we went in second gear till at last we reached the snow line. The car could not progress any further, so we started out behind our guide. The snow was at least four feet deep, packed hard and thawing. Up and up we climbed, our boots soaked from the wet snow, and the four of us perspiring freely in the warm sunshine. Many times we wished to quit, but in answer to our "how much further?" we were always inspired on with the assurance that it was only around the next point. How this mountain man at last found this small outcrop on the east slope of this ridge is beyond me as the snow had just thawed enough to show it. We were rewarded by obtaining about 50 pounds of material, which had to be packed down to the car.

Riding down again was enjoyed, I can assure the reader.

Our guide also knew where the Californite (California jade) deposit was, and, having brought along a few sticks of dynamite, we obtained a good supply without hardship. We camped on the bank of Indian Creek, and the water rushing over the boulders soon lulled us to sleep.

Early next morning we were away, for now we had a long ride to our next mineral vicinity. Retracing our steps up the Klamath River, we viewed the placer miners at work on the bars most of the way. Arriving at Yreka, we turned south as far as Shasta City, leaving Mt. Shasta on our left. We kept east and made fast time on a good road, skirting the Lassen Lava beds to Burney. Darkness forced us to camp on top of the Warner Range (elevation being about 5,000 feet) having covered about 280 miles. We cooked breakfast in this chilly atmosphere and then left for Alturas, about 30 miles away. The natives were just beginning to stir as we rushed through this small but prosperous cattle center. Continuing onto Cedarville, our last outpost for supplies, we checked our water, gasoline and reserves.

Heading east into the dry and arid sage brush country, the desert of this region, we crossed the border into Nevada on a dusty road. Now we had left civilization behind, and were in the *never, never, country of America. For close to a hundred miles we saw but one jack rabbit and six antelopes, and marvelled as to how these creatures could exist in such a desolate waste. I might mention here that antelopes are plentiful in this region; the U.S. Government having reserved the area for these animals. I do hope they will not ban mineral men, though, of course, any hunting with a gun certainly should be prohibited.

* Never Never Country—the desert back block of Australia, as it is known to mining men.

About 70 miles from Cedarville we turned south on a wheel track road and winded our way through the sage brush and around small hills for 12 miles when our host's hacienda came to view. We had not met our host, Mr. Mark Foster (or "Virgin Valley Mark" as we call him) before, but had engaged in correspondence. He was awaiting our arrival and made us welcome. Mr. Charles Barnett, of Barnett's Agate Shop of Portland, had arrived the day previous on a mineral trip. A hearty dinner and the lamp lighted, and needless to say we talked late into the night. Next morning our good host and Mr. Barnett took us to the dumps of the Bonanza Opal workings, which we combed amid the shouts of joy when a fiery fragment of precious opal was uncovered.

BOOKS

Story of the Gems, H. P. Whitlock	$ 3.65
Getting Acquainted with Minerals, Geo. L. English	2.65
Minerals of N. Y. City, J. G. Manchester	2.65
How to Study Minerals, E. S. Dana	2.15
Hand Book for the Amateur Lapidary, J. H. Howard	2.00
Dana's Text Book, Wm. E. Ford	5.75
Dana's System of Mineralogy	15.50
Fluorescence of Minerals, Chester B. Slawson	.55
How to Collect Minerals, Peter Zodac	1.00
The Book of Minerals, Dr. A. C. Hawkins	1.50
Fossil Penn Coal Flora of Northern Ill., A. C. Noe. Fine illustrations	1.00
Field Book of Common Rocks, Prof. Fred B. Loomis	3.65
Dana's Manual, Wm. E. Ford	4.25
The World Minerals, L. J. Spencer, 40 colored plates	5.25
Praktikum der Edelsteinkunde. By George O. Wild, Gem Expert of Idar, Germany. Contains most beautiful color plates of gems ever produced. Published in German only. Price	2.50

John A. Grenzig

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The next day we visited the dumps of the famous Rainbow Ridge Mine. Here again fine fragmentary pieces of fire opal were found. In the afternoon we visited the fluorescent common opal deposits where our host again loaded us up. It was with deep regret that we took leave the following morning.

Our road led us north to Denio, Oregon, where we again replenished our supplies. Denio is a very small settlement consisting of the general store and a few houses amid a desert setting. From here we headed south-east with great disappointment, as we passed the signs reading "To Jungo", that we couldn't turn off to the edge of the Black Rock desert and visit the fabulously rich Jumbo gold mine. This mine was recently obtained by Mr. George Austin, a Nevada desert storekeeper, for a grubstake of $500.00. He sold the mine last week for $10,000,000. However, it was Saturday and the time was getting short. At about 10 P.M. we arrived in Lovelock where we stayed to clean up a bit before presenting ourselves to civilization.

Next morning we arrived in Reno where we, of course, visited the games of chance. Being Sunday, the tables were very busy; the patrons being mainly miners on their visit to the city to spend their earnings gained from the rich silver and mineral mines for which the State is famous.

Then through Truckee, on over the Sierra Nevada Range, and down through the rich Mother Lode country to Auburn, Sacramento, and home. It was with sadness in our hearts, but with lightness of step and a much younger feeling, that we went to work the next morning enriched in our knowledge of the great outdoors. Our nine day mineral hunt gave memories that time will not erase, and we are straining at the leash to get going again.

—Club and Society Notes—

Boston Mineral Club

At the annual election of the Boston Mineral Club, Boston, Mass., held in December 1937, the following officers were elected to carry on the Club's activities during 1938:

President ..... George A. Wilson
Vice-President ..... Ralph H. Carlisle
Secretary-Treasurer. . Mabel V. Worley.

The Club's membership has increased to 126. Many interesting programs have been planned for the new year and the Club seems destined to be a great success.

Mabel V. Worley, Sec.-Treas.
16 Heckle St.,
Weslleslley Hills, Mass.

Rocks and Minerals Ass'n

During the month of December, 1937, 184 members were enrolled in the Association—the largest number received in one month in the Association's history. Of thenumber enrolled, 45 were new members. This increases the total membership to 2739.

We are also pleased to announce that $30.00 have been donated to the Association by two members. The larger donation, $25.00, was from a member in New York City who wishes that his name be kept anonymous; the other donation of $5.00 was from Mr. John Rechholtz of Brooklyn, N. Y.

The Association's funds, now increased to $32.45, have been placed in the Peekskill Savings Bank, Peekskill, N. Y., where they will draw interest at 2%.

Peter Zodac, Sec.-Treas.

THE AMATEUR LAPIDARY

Conducted by ARTHUR KNAPP
1401 Arch St., Philadephia, Pa.

Amateur and professional lapidaries are cordially invited to submit contributions and so make this department of interest to all.

A REAL MACHINE

By WM. RALPH HOFFA

About eight months ago I called on Mr. John Vlismas in New York City to see a demonstration of his lapidary machine. I had been using a vertical lap machine for over five years with varying degrees of success and was naturally interested in what he had to offer. Some of my problems I never solved. One of them was the end thrust of the shaft for sawing; this same problem presents itself when trying to cut a long narrow facet on a very hard stone as any variation in pressure allows the shaft to find a different running center. I have had to spend several hundred dollars in having saw riggings and holders, special grooved laps, pans for control of spray, etc., made, and so it is no wonder that I was interested in Mr. Vlismas' new machine.

Well, after the demonstration, I immediately became convinced that this horizontal lap machine was what I really needed and it was purchased with the exception of the motor, pulleys, powders and felt laps which I already possessed.

The floor space occupied by this machine set in its table is only 26x32 inches. This outfit made obsolete the housefurnishing department of pans, splash guards, saw holders, cementing blocks, etc., and everything needed can be accommodated on the shelf below the table. I ran hot and cold water pipes to its swing arm for my water supply.

As I have only an hour or two during the evening to work on the machine, its compactness and ease of operations means that I can now get something done. The running water at the table allows me to wash both the specimen and my hands at the same time without running to the sink as formerly. Only on some occasions does a very fine, fog-like mist reach almost to the top of the table, during work, so that I do not even have to wear a rubber apron.

From the very start I have had success with this machine. I can really saw a slice of stone so thin that only a small amount of work is necessary to make a micro slide. This proves that there is no up and down thrust of the shaft. I now saw the part off that I previously would grind, as it can be done so easily and quickly. When it comes to polishing a large flat piece, I get a very high gloss all over, not just in some places. And for really true spheres, I made seven the first week; these are beautiful stones ranging in size from ¾" to 1¼" in diameter. I am now working on some up to 3½" of clear quartz crystal.

The Vlismas Stonecraft Cutting and Polishing Machine is a real machine, not a toy, that you can do anything on from cutting a simple cabochon up to making an ash tray or inlay jewel box.